Gandaki University
Gandaki Province, Pokhara, Nepal
Teachers': Syllabus- 2077

1. Subject: Research
Unit: Directorate of Research
Post: Associate Professor/Reader-Research

The syllabus covers the general topics and areas of major subjects related to basic science including Natural Resource management, Health Science and the other pertinent areas related to research, communication, publication and research management.

Basic Science- weightage- Low to Medium

Basics of anatomy, physiology, biochemistry, carbohydrates, amino acids, lipids, metabolites, Enzyme and their activity

Applied knowledge, capacity, and management- weightage- Medium to High

- Knowledge about Advanced Research Methods including statistical analysis and design
- Knowledge about Proposal writing
- Knowledge on Grants writing
- Research Management related knowledge, capacity, confidence
- National and International collaboration
- Knowledge about National and International donors related to research project funding
- Knowledge about National and International peer reviewed journals/periodicals/scientific publishers
- Knowledge on Information technology related to proposal bidding/workshop/conference organization
- Overall research management capacity/administrative knowledge and experiences.

2. Subject: IT

Faculty: Faculty of Engineering/ICT

Post: Assoc. Professor/Reader-ICT

Section A: Academic knowledge (subject-oriented)

I**. Background of IT**

1. Background and future of IT
2. Knowledge about advanced computer architecture
3. Technical communication 4. Advanced problem-solving techniques

II. System design and development

1. Object Oriented Design and Modeling through UML
2. Knowledge of programming language (Front end and Backend level)
3. Machine learning
4. Database Management System
5. Management Information System (MIS)

III. Network and Communication

1. Telecommunication system
2. Network Theory
3. Control system

IV. Data management and analysis

1. Data analytics
2. Big data
3. Cloud computing
4. Mobile computing
5. Data mining and warehousing
6. Software engineering
7. Signal System & Processing

V. Basic electrical and electronics

1. Electrical system
2. Digital logic
3. Instrumentation
4. Control system

VI. Organization and management

1. Project organization and management
2. Research methodology
3. Social and professional issues in IT
4. Business planning and management
5. Entrepreneurship

VIII. Machine learning

1. Machine learning; Artificial Intelligence and its implications (both technical issues and ethical complexities)
2. Cloud computing and open-access data based mining/management/research

VII. Mathematics

1. Probability and statistics
2. Discrete structure
3. Numerical method
4. Operation research
5. Managerial economics

VIII. Security

1. Information security
2. Cryptography
3. Security protocols

Section B: Specific and advance knowledge testing

I. Specific knowledge testing

MIS (Management information system)

1. Advanced problem-solving techniques
2. Object Oriented Design and Modeling through UML
3. Software design

a. Front end and back end programming (New generation programming, such as machine learning)

b. SDLC (Risk analysis)

4. Testing (Different levels of testing of the system)

II. Advanced knowledge testing

1. Software engineering
2. Validation and verification a. SRS (Software requirement specification) document
3. Data analysis (Data mining)
4. Analysis of system

a. Feasibility study of the system

i. Technical analysis ii. Economical analysis

b. Statistical analysis of the system

i. Variance analysis ii. Data mining

5. E-governance
6. Telecommunication and security

Section C: Contemporary development of IT science

I. Current status of IT

1. Development and uses of IT in Nepal
2. Discovery and disciplines of IT in natural and social aspects
3. Existing telecommunication policy
4. Existing policy of IT

II. Shaping future of IT

1. Adapting new technological advancement (Accepting emerging IT)
2. Computer-aided design (CAD)
3. Solving existing problems of IT development
4. Use of mathematics to explore the use and management of IT

5. International level of IT policy

Section D: Research methods and advances including knowledge of statistical analysis and tools

I. Methods of research

1. Research design 2. Sampling 3. Variables 4. Hypothesis testing

5. Primary and secondary data 6. Qualitative and quantitative methods

7. Methods of research

a. Experiment method b. Scientific method c. Case study

II. Advanced knowledge and tools of statistical analysis

1. Data interpretation methods 2. Measures of central tendency 3. Sample size estimation

4. Parametric and non-parametric tests 5. Data presentation tools

Section E: Knowledge application and system perspective

1. Conceptual framework for Knowledge management
2. Emerging IT
3. Innovations in IT
4. Relationship between knowledge management and IT innovation
5. Knowledge-based theory (Information processing approach)
6. R&D (Research and development) & knowledge application
7. Knowledge and Information System (KIS)

Section F: Data structure & Algorithm

1. Concept of data structure like Stack, Queue, Tree
2. Concept of operations like search, sort, traversal

3. Subject: Pharmacy
Faculty: Faculty of Pharmacy
Post: Associate Professor/Reader

The syllabus covers the general topics of major subjects taught in pharmacy. The weightage of each topic is different.

Basic Science- weightage- Low

Basics of anatomy, physiology, biochemistry, carbohydrates, amino acids, lipids, metabolites, Enzyme and their activity

Pharmaceutics- weightage- Moderate

Fundamental of pharmacy, Pharmaceutical calculation, Formulation (drug dosage form) and manufacturing of pharmaceutical products, Pharmacopoeia, Physical pharmacy, Biopharmaceutics, Quality assurance

Pharmacology and Toxicology- weightage- Moderate

Pharmacokinetics, ADME, Pharmacotherapeutics, Adverse drug reaction, Drug interactions, Antidotes Pharmaceutical Chemistry- weightage- Moderate Fundamental of chemistry, Instrumental analysis and quality control, Structural activity relationship

Pharmacognosy- weightage- Moderate

Phytochemistry, Himalayan medicinal plants, Standardization of herbal drugs, Phytopharmacology, Plant-based functional foods

Pharmacy Practice -weightage- Moderate

Drug distribution system in hospitals, Community pharmacy, Rational use of the drug, Evidence based medicine, Clinical management of ADRs, Hospital formulary, TDM, Patient counseling, Medication error and adherence

Research Methodology and Statistics- weightage - High

Study design and methodology, Sampling techniques, Measure of central tendency, Probability, Significance test, Univariate and multivariate analysis; data design drug design and discovery

Pharmaceutical Jurisprudence- weightage- Low

Regulatory agencies and affairs, Act and regulations of Nepal- Drug act, NPC act, Drug development process; Intellectual Property Right in modern and traditional drug practice

Pharmaceutical Microbiology and Biotechnology weightage- weightage- Low

Microbial taxonomy, DNA, RNA, Proteins, Transcription, Translation, Genetically modified organisms, Biotherapeutics, Recombinant DNA technology

Big data and statistics- weightage-Moderate

Issues of ethics- usage and administration- weightage-Moderate

4. Subject: Research/Innovation
Unit: Directorate of Research
Post: Assistant Professor/Lecturer-Research

A. Biophysical and Forest Environment: Conceptual Understanding

Physical and Biological Environmental: a) Nature and functioning: atmosphere, hydrosphere, lithosphere and biosphere, climatic components, climatic variation; b) human impacts on the functioning of the atmosphere, hydrosphere, lithosphere and biosphere; c) biophysical issues and their importance in sustainable management of the environment, d) biosphere and H2O, C, N, O, S, P cycle, biotic communities; e) concept of productivity-gross and net; ecosystem types; f) function and stress: concepts of ecosystem; g) homeostasis and structure of an ecosystem, function of ecosystem; h) types of ecosystem: aquatic, terrestrial, agricultural landscape, food chain, food webs, tropic levels, ecological pyramids, ecosystem energetic, ecological succession, eco-tones, edge effect, adaptation and ecotypes, ecological niche.

Forest Environment: a) Forest Environment: Forest ecosystem; role of forest in environment; b) forest resources: forest types and their characteristics; c) distribution of forest area by types; composition of forest vegetation in different eco-types

B. **Environmental Pollution, Assessment and Management tools and System**

Environmental parameters and pollution control measures:

a) Environmental quality and pollution (air, water, soil, noise and light); types of pollutions and its control; b) Solid and Hazardous Waste Management: Sources, types, composition & properties of municipal solid waste (MSW); c) Integrated management of MSW; d) various initiatives, policy, plan, and strategy level and legislation and institutional development related to waste management.

Concepts, theories and methods of various EMS tools:

a) Environmental management system and tools; b) Life Cycle Assessment (LCA), Overview, history, LCA types, principles and methods, and application of LCA; c) Quantitative and qualitative Risk Assessment: Human health risk assessment, ecological risk assessment.

Application of Tools in Environment Assessment:

a) EIA, IEE, Strategic Environmental Assessment (SEA); b) Multi-criteria Decision Analysis Hierarchy of decision, Decision making models - Intelligence phase, Design phase, Choice phase c) Application of remote sensing and GIS in environment assessment d) research and case studies related to environment assessment and analysis.

Environmental management decision:

a) Quality Management System: Evaluation of organization and products; b) ISO 9000, ISO 14000 and ISO 18000, environmental performance evaluation, environmental auditing, activities in Nepal; c) Cleaner Production: Cleaner production and cleaner

development mechanism, Principles of CP, environmental labeling, eco-design, CP activities in Nepal.

C. **Ecosystem Services Assessment and Valuation**

Basic concept of ecosystem theories, ecosystem structure and function:

a) ecosystem theories (self-organization, hierarchy, orient or, thermodynamics); b) biodiversity; ecosystem health and integrity; disturbance; c) Typology of ecosystem services; ecological resilience and adaptability; challenges of ecosystem services.

Valuation of ecosystems services:

a) concept of ecosystem service evaluation; b) types of evaluation of ecosystem services (ecological and economic valuation); c) economic value of ecosystem service; consumptive use; d) productive use; assessment/analysis of ecosystem services.

D**. Climate Change: Concept, its impact, mitigation and adaptation measures**

Concept on climate system:

a) defining concepts and terminologies, theories and drivers of climate change, climate change indicators, climate modelling; b) Greenhouse gas, global warming and climate change; greenhouse gases effect and global warming, global warming potential.

Impacts of climate change:

a) Impacts on different sectors (living being, forest, agriculture, livelihood), b) Extreme impacts: Risk, hazard, vulnerability and climate change induced disasters: Introduction, types of climate induced hazards, vulnerability to climate change, framework for DRR and DRR tools, climate change risk management in Nepal Practical exercise.

Mitigation& Adaptation limiting climate change:

a) Concept of mitigation, mitigation options, mitigation approaches, mitigation strategies applied in Nepal (for e.g., REDD+); b) Living with climate change.

E. Environmental Governance Policy and Legislations

Governance: a) Overview of global environmental issues; b) Human dimension and environment and Global environmental governance; c) Major elements of environmental governance (participation, transparency, accountability and governance norms) and d) Key steps adopted for global environmental governance.

Initiatives for Environmental Management: a) Policies, Plans, Strategies and Environmental Laws; b) Role of Judiciary for Protection of the Environment, Policies and Laws to Address Climate Change; c) Trade and fiscal Laws for Environmental Management.

5. Subject: Information Technology (IT)

Post: Assistant Professor/Lecturer- IT/ ICT

Section A: Academic knowledge (subject-oriented)

I. Background of IT

1. Basic concept of IT
2. Knowledge about computer architecture
3. Problem solving techniques
4. Technical communication

II. System design and development

1. Information system
2. Basic programming knowledge (E.g., C, C++)
3. Front end programming language (E.g., Java, .NET)
4. Backend programming Language (E.g., DBMS)
5. Machine level programming (E.g., Artificial Intelligence, Python)
6. Microprocessor
7. Simulation and modeling

III. Network and Communication

1. Communication system
2. Computer network
3. Control system

IV. Data management and analysis

1. Data mining and warehousing
2. Software engineering
3. Image processing and pattern recognition

V. Basic electrical and electronics

1. Electronic devices and circuits
2. Electrical system
3. Digital logic
4. Control system
5. Instrumentation

VI. Organization and management

1. Project organization and management
2. Research methodology
3. Social and professional issues in IT
4. Entrepreneurship

VII. Mathematics

1. Probability and statistics
2. Discrete structure
3. Numerical method
4. Managerial economics

VIII. Security

1. Information security
2. Cryptography
3. Security protocols

Section B: Specific and advance knowledge testing

I. Specific knowledge testing

1. Problem solving techniques
2. Information system design
3. Data Structure and algorithm (Structures like Stack, Queue, Tree and Operations like search, sort)
4. Software design a. Front end programming (E.g., Php, Java, Python) b. Back-end programming (E.g., My-Sql, MS-Sql, Oracle)
5. Testing (Different levels of testing of the system)

II. Advanced knowledge testing

1. Software engineering
2. SDLC (Software development life cycle)
3. Validation and verification a. SRS (Software requirement specification)
4. Data analysis (Data mining)
5. Analysis of system

a. Feasibility study of the system i. Technical analysis ii. Economical analysis

b. Statistical analysis of the system i. Variance analysis ii. Data mining

6. Communication and security

Section C: Contemporary development of IT science

I. Current status of IT

1. Development and uses of IT in Nepal
2. Issues and existing policy of IT development in Nepal
3. Use of IT

II. Shaping future of IT

1. Adapting new technological advancement (Accepting emerging IT)
2. Computer-aided design (CAD)
3. Solving existing problems of IT development
4. IT revolution in fields such as government, gaming, social networking, and cloud computing, etc.

Section D: Research methods and advances including knowledge of statistical analysis and tools

I. Methods of research

1. Research design 2. Sampling 3. Variables 4. Hypothesis 5. Primary and secondary data
6. Qualitative and quantitative methods 7. Experiment method

II. Advanced knowledge and tools of statistical analysis

1. Data interpretation 2. Measures of central tendency 3. Sample size estimation 4. Parametric and non-parametric tests

Section E: Knowledge application and system perspective

1. Knowledge management 2. Emerging IT 3. Innovations in IT 4. Relationship between knowledge management and organizational innovation 5. Knowledge-based theory (Information processing approach) 6. Knowledge application 7. R&D (Research and development) & knowledge application.

6. Subject: Pharmacy

Faculty: Faculty of Pharmacy
Post: Assistant Professor/Lecturer

The syllabus covers the general topics of major subjects taught in pharmacy. The weightage of each topic is different.

Basic Science- weightage- High

Basics of anatomy, physiology, biochemistry, carbohydrates, amino acids, lipids, metabolites, Enzyme and their activity

Pharmaceutics- weightage- Moderate

Fundamental of pharmacy, Pharmaceutical calculation, Formulation (drug dosage form) and manufacturing of pharmaceutical products, Pharmacopoeia, Physical pharmacy, Biopharmaceutics, Quality assurance

Pharmacology and Toxicology- weightage- Moderate

Pharmacokinetics, ADME, Pharmacotherapeutics, Adverse drug reaction, Drug interactions, **Antidotes Pharmaceutical Chemistry**- weightage- Low

Fundamental of chemistry, Instrumental analysis and quality control, Structural activity relationship

Pharmacognosy- weightage- Moderate

Phytochemistry, Himalayan medicinal plants, Standardization of herbal drugs, Phytopharmacology, Plant-based functional foods

Pharmacy Practice- weightage- Moderate

Drug distribution system in hospitals, Community pharmacy, Rational use of the drug, Evidence based medicine, Clinical management of ADRs, Hospital formulary, TDM, Patient counseling, Medication error and adherence

Research Methodology and Statistics- weightage Low

Study design and methodology, Sampling techniques, Measure of central tendency, Probability, Significance test, Univariate and multivariate analysis

Pharmaceutical Jurisprudence- weightage- weightage Moderate

Regulatory agencies and affairs, Act and regulations of Nepal- Drug act, NPC act, Drug development process

Pharmaceutical Microbiology and Biotechnology- weightage- Moderate

Microbial taxonomy, DNA, RNA, Proteins, Transcription, Translation, Genetically modified organisms, Biotherapeutics, Recombinant DNA technology